Focus on Axillary Arteries

Surgical Treatment of Axillary Artery Aneurysm

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Aneurysms of the axillary artery are rare and dangerous lesions that threaten the upper extremities with vascular and neurologic compromise. Most can be treated effectively with surgical excision and vascular grafting.

We retrospectively assessed 4 axillary artery aneurysms upon which we operated from February 1998 through March 2004. Three patients were admitted to our clinic for symptomatic axillary masses. The remaining patient was transported to our clinic emergently due to massive hemorrhage of an enlarging axillary mass that occurred during biopsy of the mass at another hospital. In this patient, the ruptured axillary artery aneurysm was diagnosed by means of emergent upper-extremity selective angiography. All patients were treated surgically by means of aneurysmectomy and graft interpositioning—with polytetrafluoroethylene grafts in 2 patients and saphenous vein grafts in the other 2.

Surgical treatment of axillary artery aneurysms is of importance in avoiding thromboembolism and ischemia, which in turn can lead to gangrene and amputation of the affected extremity. For this reason, operative management of such cases should not be delayed. ***(Tex Heart Inst J 2005;32:186-8)***

Axillary artery aneurysms are very rare and almost always occur as a result of penetrating or blunt chest trauma. Occasionally, they develop as a result of an atherosclerotic process over a long period of time. They can cause vascular complications, as well as neurologic complications, because of their proximity to the brachial plexus.[1-5] We retrospectively assessed the cases of 4 patients with axillary artery aneurysms.

Key words: *Aneurysm/surgery; arm/blood supply; arteriosclerosis/complications; axillary artery/surgery; upper extremity/surgery*

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Patients and Methods

From February 1998 through March 2004, we operated on 4 axillary artery aneurysms in 4 men whose average age was 59 ± 3.2 years (range, 56–67 years).

One patient, with an axillary mass and upper-extremity paralysis, had been admitted to another chest surgery clinic. This patient was sent urgently to our clinic because of massive hemorrhage that developed during biopsy of the mass. Emergent selective angiography of the upper-extremity and coronary arteries was performed under a presumptive diagnosis of axillary artery aneurysm. A ruptured axillary artery aneurysm and a 60% stenosis of the 1st diagonal branch artery were seen on angiography, and the patient was operated on emergently.

The other 3 patients were admitted to our clinic because of axillary artery aneurysms (Fig. 1). Two of them presented with pain and numbness of the affected extremity. The 3rd patient had been operated on 9 years earlier due to an axillary artery aneurysm in the other upper extremity. On physical examination of these 3 patients, the arterial pulses of the upper extremities were palpable, with no sign of ischemia. Doppler ultrasonography was performed in all 3, and coronary with selective upper-extremity angiography was performed in 2 of the 3 patients. Angiographic evaluation was not performed in 1 patient, who had undergone coronary artery bypass grafting (CABG) 2 years before; he had no sign of ischemia upon exercise testing. His diagnosis of axillary artery aneurysm was confirmed with contrast-enhanced computed tomography. Doppler ultrasonography of these 3 patients revealed axillary artery aneurysms in the following sizes: 50 × 50 mm, 40 × 60 mm, and 50 × 60 mm.

Angiographic evaluation of 2 patients revealed no sign of coronary artery disease or thromboembolic occlusion of the upper-extremity arteries. There was no evi-

Fig. 1 *The appearance of the pulsatile axillary mass before the operation.*

dence of connective tissue disease or prior traumatic injury in any of the patients.

Surgical Technique

All patients were treated surgically under general anesthesia. They were placed in a supine position, with the shoulder slightly elevated and the arm in a horizontal position, forming a 90º angle with the body. Infraclavicular and deltopectoral incisions were used for aneurysmal resection. The skin incision was extended from the middle of the clavicle to the anterior axillary line in the direction of the apex. In all patients, the pectoralis muscle was divided along its fibers, and the pectoralis minor muscle was transected.

Pseudoaneurysm due to rupture of the axillary artery aneurysm was detected in the patient who underwent emergent operation. Large axillary artery aneurysms were seen in the other 3 patients. Axillary artery segments proximal and distal to the aneurysm were explored first. The aneurysm was resected subsequent to clamping of the proximal and distal arterial segments after the intravenous injection of 5,000 IU of heparin.

After aneurysmectomy, we interposed a polytetrafluoroethylene (PTFE) graft in 2 patients and a saphenous vein graft in the other 2. The specimens from the aneurysmal wall were sent for histopathologic examination.

Results

There were no deaths or losses of extremities. In the patient who had upper-extremity paralysis and underwent emergent operation, the paralysis did not resolve during the postoperative period. He was referred to a physical rehabilitation program. Histopathologic examination of the resected aneurysm sections revealed atherosclerotic and degenerative changes. Patients were followed up for a mean period of 3.2 ± 0.41 years. We did not observe any vascular problems. During the follow-up period, graft patency was 100%.

Discussion

Axillary artery aneurysms are rare and almost always occur as a result of penetrating or blunt chest trauma. They may also occur iatrogenically or as a postobstructive lesion due to thoracic outlet syndrome or to the chronic use of crutches.[6] Atherosclerosis as a cause is very rare.[1] Szuchmacher and colleagues[7] reported 2 cases of atherosclerotic aneurysm, one with bilateral and the other with unilateral involvement. Michalakis and co-authors[1] reported 1 case, and Neumayer's group[5] reported 2 cases of atherosclerotic aneurysm of the axillary artery. None of our patients had a history of trauma. In addition, we found no evidence of thoracic outlet syndrome. Atherosclerotic degenerative changes were detected upon histopathologic evaluation of the aneurysmal specimens.

Axillary artery aneurysms can cause temporary or permanent neurologic defects by compressing the brachial plexus. They can cause thromboembolic complications as well.[6,7] There were no embolic complications in our patients, and pulses were normal. However, a motor function impairment due to brachial plexus compression, detected preoperatively in 1 patient, has continued into the postoperative period.

Although many vascular problems can be treated by endovascular interventions, the surgical approach is still, in numerous instances, the best choice. Aneurysmectomy and grafting with a saphenous vein is a contemporary treatment choice for many patients with axillary artery aneurysms. One of the major objectives of the surgery is to avoid injury to the brachial plexus, because of its proximity.[1] Although prosthetic grafts are used successfully for axillary artery reconstruction, saphenous vein grafting is better for long-term patency.[1,8] Brachial or axillary veins can also be used for reconstruction; however, because these veins tend to develop aneurysms, saphenous veins should be the 1st choice when available.[6] We used a PTFE graft in 1 patient because of inadequate quality of the saphenous vein, and in another patient because of his lack of a saphenous vein, which had been used in previous CABG. Saphenous vein grafts were used in the other 2 patients.

Axillary artery aneurysms can cause vascular or neurologic compression complications, thromboembolic events, or rupture, so they should be treated surgically and reconstructed with suitable grafts once they are diagnosed.

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